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WILLETT & GRAY'S LATEST REPORT OF THE AMERICAN SUGAR MARKET. JAN. 4, 1900.

RAWS.—The holiday week has been inactive, but extremely firm for raw sugar. The new year opened with Centrifugals at 4¼c. per lb. for 96° test basis, and with very little offering. There were 21,000 tons of receipts, but all of these were placed with refiners previous to arrival. There will no doubt continue a good demand for all the cane sugars that may come upon the market for some time to come.

REFINED.—The market remains steady and unchanged, with a fair demand at the closing of the year. We do not hear that much buying has yet resulted from the new terms coming into place this week. All the refiners are not yet agreed upon terms and conditions of sale, especially as regards guarantees. There are rumors of guarantees to April 1st, but the Doscher refinery refuse any guarantees and the Howell refineries are mostly out of the market, not running at present time. Arbuckle is selling at net prices to all sections. Meltings are reduced again by the holidays, but are sufficient for the demand.

There is not the least sign or suspicion of any settlements, arrangements, combinations or what-not among our refiners, and all buyers of refined can act accordingly. All guarantees are withdrawn and everything is now on fighting basis for the competition of the trade. The next move of importance will be watched for with interest. The American Company have adopted the "Eagle Brand" for all their packages of Granulated. As expected, freight rates advanced about 20 per cent. on January 1st.

Licht has increased his estimate of the European beet crop to 5,480,000 tons, against 4,984,000 tons last campaign.

RAW SUGAR PRICE REVIEW, 1899.—Duties remained unchanged during the year. Centrifugals opened January 1st at 4.31c. per lb. net, declining to 4.25c. at close of month, advancing steadily to 4.75c. May 4th, the highest point of the year, declining steadily to 4.25c. in November and continuing the same quotation to end of year. The average price of Centrifugals in 1899 was 4.419c. per lb., against 4.235c. in 1898, 3.557c. in1897, 3.624c. in 1896, 3.270c. in 1895, 3.24c. in 1894, 3.689c. in 1893, 3.311c. in 1892, 3.863c. in 1891.

REFINED SUGAR PRICE REVIEW, 1899.—The year opened with Granulated at 4.65c. lb. net, advanced steadily to 5.21c. in June, remaining there until August, since declining to 4.77c. @ 4.82c., at which the year closes. The average price of Granulated in 1899 was 4.919c. per lb., against 4.965c. in 1898, 4.503c. in 1897, 4.532c. in 1896, 4.152c. in 1895, 4.12c. in 1894, 4.842c. in 1893, 4.346c. in 1892, 4.641c. in 1891. The average difference between Centrifugals and Granulated was .50c. per lb. in 1899, against .73c. in 1898, .946c. in 1897, .908c. in 1896, .882c. in 1895, .88c. in 1894, 1.153c. in 1893, 1.035c. in 1892, .778c. in 1891. The smaller difference noted in 1899 is the direct result of the operation throughout the year of the increased number of independent refiners in competition with the American Sugar Refining Co. This small difference will no doubt continue through 1900.

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CANE SUGAR.—Messrs. F. Goddard & Co., Limited, of Bath, England, make an important announcement to the trade through the pages of *Confectionery*. It is to the effect that it is their intention to return to the use of cane sugar only. In the opinion of the firm it is an open question as to whether the trade was not in a better condition when cane sugar was used than it is in the present chaotic state. So far as Messrs. Goddard & Co. are themselves concerned, they found a very great demand for it when it was used before, and since they have returned to it this last month orders have been coming to them freely, thus strengthening them in their resolve to renounce beet and stick to the good old Colonial-grown, English-refined cane sugar. The firm's price will remain the same

as hitherto, so that the trade and the public will have the benefit of the change that is made."—Mackay Standard.

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A NEW SUGAR TRUST.—According to a recent telegram from Dover, Del., a new sugar trust has just been incorporated at said place, under the style of "The Colonial Sugar Refining Company," with a paid up capital of $10,000,000; it would seem that the new concern is a rival of the American Sugar Trust, and among the shareholders are included several of the principal financiers in the United States. The new company purposes to conduct in Cuba, Porto Rico and Hawaii, the sugar refining business on an extensive scale by means of a special process patented by the company, which will allow the refining to be done on the plantation simultaneously with the cooking of the sugar, which considerably reduces expenses thereof.—Exchange.

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What is probably, the largest cargo of sugar which has ever been entered in New York, arrived recently in the British steamship India, from Samarang, East Indies. It consisted of 7,926 long tons of cane sugar, and was valued at over $500,000. The freight due the vessel on this cargo was over $60,000, and the duty collected by the government on it was over $150,000.

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The attention of sugar men is called to the advertising pages of the Planter, which contain the notices of some of the best firms in the United States. A large proportion of the machinery in the sugar factories of Hawaii was made and erected here by firms whose names appear in the Planter, and we do not hesitate saying, that Hawaiian mills are not surpassed by those of any other country.

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IMPROVEMENT OF THE SUGAR CANE.

Our readers are aware that experiments are being made in various sugar cane countries, to improve cane, as regards the quantity and the quality of the juice, and consequently of the yield of sugar. Recently a hill of sugar cane has been successfully grown in the Kew Gardens in England, from seeds (not sugar cane stalks) sent there by Mr. Bovell of Barbados. This new variety, it is stated, promises to be a

richer cane than the parent was, but a full report can only be given after the results of this year's growth are obtained.

From Java, Dr. Kobus, the well known director of the Agricultural Station there, who has been experimenting in this line, has written to the director of the Kew Gardens, London, giving the result of his three years' work, which promises to be very successful. We quote from his letter, which is dated March, 1899:

"Nearly three years ago I proposed the same to the principals of the experimental station at Pasoeroean. As I myself was appointed Director in the same year, I commenced after my return from Europe in May, 1897, with the analysis of nearly 6,000 canes and cane-clumps, and found that the available sugar in canes of the same age varied by as much as 2 per cent. At the same time I showed that canes grown from the same cutting and of nearly the same age might show a difference in available sugar of from 7 to 8½ per cent. I concluded therefrom that it was not advisable to select individual canes, but that it was necessary to select cane-clumps. When the juice of a whole cane-clump, except the tops, has a great amount of available sugar, every cane of the clump must have it also, and the chance that its descendants are rich and others of the same clump are very poor, and the cuttings of these rich canes used for selection. After I had arrived at this conclusion, I analysed 5,000 cane-clumps belonging to five varieties, and selected 10 per cent of the highest and 10 per cent. of the lowest polarizing plants. I had the pleasure to send you the pamphlet No. 41 with the results of the analyses in October, 1897.

"Since then I have reaped the canes grown from the cuttings, and found that the descendants of the rich canes contained 1½ per cent. more available sugar than the descendants of the poor canes (average of 3,200 analyses). I was astonished to find that the rich canes' descendants were heavier than the descendants of the poor canes. I continued the selection with canes from other varieties or other fields (5,700 analyses), and found as a general rule that the rich canes were the heaviest canes, and the richest in available sugar. I concluded from this that both a high content of available sugar and a heavy weight are inherited by the descendants."

It will thus be seen that the good work of persevering efforts to improve the sugar cane is going on in various parts

of the world. No better place can be found for this work than Java, where cane grows in perfection, but where it promises to be still further improved by seedling selections.

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Since the above was in type, we notice in the Louisiana Planter an article referring to Prof. Hart's experiments with seedling canes in Trinidad, which we quote: "Hart refers to the difficulty that occurred in getting the cane plants to survive the season's drought experienced by them, although regular waterings were given to the plants. Prof. Hart brings out the various points that should characterize a good cane in Trinidad. We think, however, that the qualities that he names would make good canes anywhere. They are as follows:

1. Good cropper.
2. Upright grower (does not fall).
3. Sucrose yield.
4. High vitality.
5. Non-liability to disease.
6. Fair fibre in megass.
7. High percentage of Juice.
8. Early maturity.
9. Easily crushed, (mills well).
10. Juice easily clarified.
11. Flinty rind.
12. Ratoons well.

"In his report of the analyses of the various canes, Prof. Hart names eleven seedlings in which the sucrose of the juice indicated 19 to 20 per cent. The juice of fourteen of the seedlings indicated 18 to 19 per cent of sucrose. The purity of nearly all of these canes ran above 90, several reaching 95 per cent.

"These very interesting studies indicate the possibility of bringing tropical canes up to such a standard of excellence in fibre and sucrose content that they may successfully compete with the best sugar-beets produced in Europe and at the same time furnish with their fibre the fuel necessary for their manufacture into sugar. Prof. Hart's excellent report will doubtless command general attention among the scientists of the sugar world."

THE BUBONIC PLAGUE.

The outbreak of this much dreaded and fatal plague in this city is very unfortunate, but it has been feared by those who have watched its increase in Japanese ports, from whence most of the Asiatic immigrants have come during the past few months. It has undoubtedly been brought here in the clothing of these immigrants, notwithstanding the strict quarantine and thorough fumigation which is established here. But the disease has been met with the strongest efforts to stamp it out that have ever been made here or elsewhere. Not only has every case been ferreted out and isolated, but every corpse has been immediately cremated, with all its belongings, and the tenements also in which they have died have been burned to the ground with their contents. And more than this, every block of wooden buildings occupied by the lower class of Asiatics in the plague district—numbering not less than one hundred dwellings, has been fired and reduced to ashes. Probably no city in the world has ever done its duty more promptly or more thoroughly in this respect than Honolulu is now doing. The plague will be, if it has not already been, completely stamped out, if such an end can be accomplished, in a manner that promises a clean record.

This has caused temporary inconvenience to travel and trade. But fortunately our busiest season has hardly commenced, and will be delayed only a few weeks at the most. There have been only 30 deaths here to date, from the bubonic plague, while the deaths from consumption and bronchitis—two allied diseases, numbered 28, in the month of December. Compared with the deaths from small pox in 1854 or the cholera in 1895, there is no cause for alarm.

Exports of produce from Hawaii, Maui and Kauai for foreign ports have not been interrupted, as there has been no epidemic on those islands. The embargo on trade on Oahu, it is hoped, will not continue long. The greatest inconvenience arises from the restrictions on travel, both foreign and inter-island, and on the delivery of produce, merchandise and machinery, very much needed. Travelers, merchants and planters must bear the ills which occasionally interfere with their plans, and be thankful that the far heavier disasters of hurricanes and frosts never reach our favored isles.

SUGAR HOUSE WORK.

We would call the attention of readers of this magazine, planters as well as engineers and others connected with mill work on our plantations to the admirable paper read by Mr. H. G. Buch. It is seldom that we find so many good, practical hints and suggestions brought into the limited space occupied, showing that the writer of the article is a most thorough student of sugar house work, who aims at perfection in it. His reference to the close of the grinding season and what should then be done to keep the machinery and all the appliances in first class condition, instead of leaving them to haphazard chance, in the hands of inferior workmen: Also his advice about starting up the mill after lying idle for a few weeks or months is to the point. His tribute to the Krajewski cane cutter is what every one will endorse, and no mill that turns out 5,000 tons of sugar should be without it. The entire article is full of up-to-date suggestions, which every planter will profit by adopting.

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CLOSE AND WIDE ROWS IN CANE PLANTING.

This subject has lately engaged the attention not only of our planters, who have made experiments regarding it, but also of planters abroad. The reports of Dr. Maxwell and of several planters at the late annual meeting of the Sugar Planters' Association referred to it, and indicated that considerable cane seed was wasted, which might have been saved for the mill, that is, when other than cane tops had to be used for seed.

In a recent number of the Louisiana Planter, is a letter from Mr. Hart who has charge of the Experiment Station on the island of Trinidad, West Indies, in which he gives the results of his investigations regarding it:

Experiment Station, Trinidad, B. W. I.

Editor Louisiana Planter:—I note your editorial on close rows in cane planting, and also the letter of "Cane Planter" on the same subject. Now, it appears to me that the distance at which canes can be most profitably cultivated, is easily ascertainable, by planting at different distances and weighing and manufacturing the produce. The distance would of course vary in accordance with the nature and char-

acter of the soil in which the cane is planted, always provided that the cane is of the same kind. Now it has been found in carrying out our seedling experiments that there are tall canes and short canes, bushy canes, and canes with meagre foliation. There are upright canes, and canes having a tendency to spread, canes broad leaved and narrow leaved. Then we have stools with many canes of small size, and stools with few canes of large size. It is evident therefore that the question of wide or narrow planting must entirely depend on the kind of cane used; for given the same percentage of sugar in each, it is easy to see that to get the same return per acre, the stools must be planted at varying distances. A small upright growing cane may, of course, be planted much closer than a large and more spreading one. Here, as heretofore, the cultivator must be the judge of the right distance and the careful observer will readily detect whether his canes ripen well or whether they are deficient in sugar and take his measure accordingly. The question of close or wide planting therefore is one which cannot be empirically treated but must be left to the judgment of the farmer, the most observant obtaining best results.

J. H. HART, F. L. S.

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THE NEW AMERICAN POSSESSIONS.

The following seems to express the ruling sentiment in America relative to the new national possessions. Congress will be guided by the President's recommendations, and will provide for the Philippines a government that will bring them blessings, and promote their material interests as well as advance their people in the path of civilization and intelligence. The insurrection appears to have been suppressed. The problem of government must now be taken up and solved. In this task the President and Congress will work together, and some legislation will be required beyond the appropriations for the support of the agents of the government. Congress should declare plainly the purpose of the United States to exercise sovereignty over the islands, with a statement of the principles in accord with which local self-government is to be established.

The bill of the last Congress for a territorial government in

Hawaii should be enacted promptly. As to this legislation there has been an unfortunate delay.

Porto Rico should have a civil government resembling that which is provided for our territories. The duties of our tariff should no longer be imposed upon the products of the island. Porto Ricans justly complain because, having lost their old markets as a result of the war, they are shut out of the only new one they can hope to obtain—a market the advantages of which they are fairly entitled to enjoy. The peaceful people of that unfortunate island deserve kind and even indulgent treatment from the great republic.

The purpose of the United States with respect to Cuba has already been defined by Congress, and the situation does not appear to call for legislation at this time.

A cable should be laid without delay on the route, recently surveyed, from San Francisco to the Philippines by way of Hawaii and Guam. It should be put down, owned and operated by the Government, and Congress should provide for the work in the early weeks of the session.

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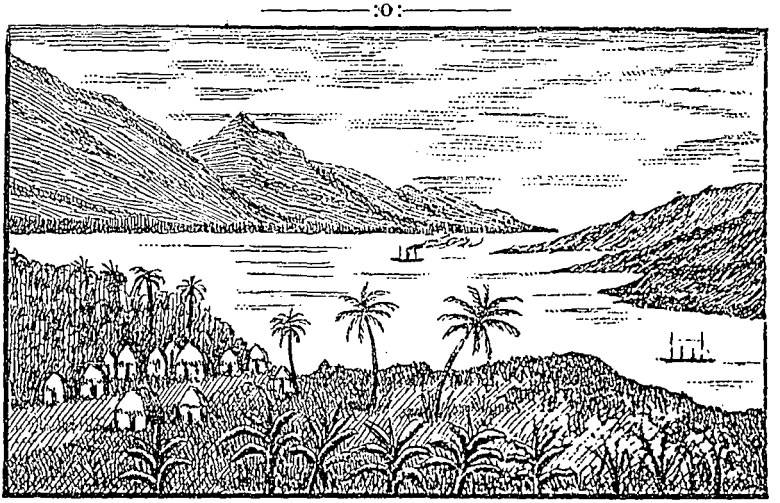

Pago-Pago Harbor, Island of Tutuila--By the Editor.

The acquisition of the island of Tutuila, one of the Samoan group, in the Pacific Ocean, by the United States, should be a matter of much interest to all Americans. While the principal value of this island consists in the advantages which it offers as a coaling station and its great security in the event of storms, yet, being located midway between Hawaii and Australia, it may, in the near future, become a commercial center

of importance on account of its magnificent harbor, Pagopago, which is one of the largest and best in the Pacific, being sheltered on all sides by hills, varying in height from one to three thousand feet. The entrance to the bay is half a mile or more in width and two miles in length, with from twenty to thirty fathoms of water in depth, and no obstructions of any kind whatever, as reported by Capt. Wakeman, who took soundings while there in 1885 or 86. The harbor or bay is some five or six miles in length, and over one mile in breadth, with soundings varying from six to eighteen fathoms, presenting a fine sheet of water, smooth as an inland lake.

All who have visited Pagopago are unanimous in confirming the statement that it is an ideal harbor, free from obstructions of any kind. Captain Wakeman, to whom the writer is indebted for these facts, and who visited Pagopago several times in the interest of Wm. H. Webb of New York in 1885 or 6, left here a rough penciling sketch of the harbor of Pagopago, and its surroundings, which has served as the basis of the above view, made by the editor of this periodical. It will furnish to the readers of this a fair idea of Uncle Sam's latest territorial possession, located about 2,300 miles nearly due south from Hawaii.

It should be also stated in this connection that tropical vegetation abounds every where on the island of Tutuila, from the sea-shore to the mountain tops, and the whole island is covered with the densest growth of large forest trees, suitable for choice furniture use, and from which the natives make canoes forty feet long. Besides forest trees, cocoanut trees, orange, limes, pines, bananas, and all kinds of tropical berries and fruits abound. The natives are a fine race, kind and hospitable to strangers, and clever in making mats and nets. They show great ingenuity in making their canoes, and their grass houses are said to be quite attractive. The language of the Samoans is entirely their own, and differs from most of the Polynesian dialects.

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AMERICAN SUGAR PRODUCERS' MEETING.

Omaha, December 15, 1899.—The American Beet Sugar Manufacturers' Association held their annual meeting here on this date. The following resolutions were adopted:

"Whereas, The consumption of sugar in the United States

now approximates 5,000,000,000 pounds, being larger in bulk and per capita than any other nation, of which enormous consumption less than 600,000,000 pounds, or about 10 per cent. are produced from sugar cane and beets within the borders of the United States: and

"Whereas, The experiments of the Government made under the direction of the Department of Agriculture and the actual production of sugar from beets at the factories located in twelve states here represented clearly evidence that this country is capable of producing, under fair safeguards of the industry, all the sugar consumed by its people; and

"Whereas, Such production affords a diversified industry of the greatest importance and is a special boon of value to the farmers of this country; and

"Whereas, The importation of cane sugar from tropical islands, under principles of reciprocity, or with free or greatly reduced duties awarded because they are insular dependencies of the United States would bring into competition a product raised by coolies and debased labor that would be ruinous to the American farmer and to the production of sugar in the United States; therefore, be it

"Resolved, The present tariff duties are essential, not only to the increase of this valuable industry, but to its very existence, and if modified in any particular, there should be no action, either by change of law or from reciprocity, that shall increase the importation of crude sugar, which affords no profit or income to the farmer, but is simply material to be refined and marketed.

"Resolved, That as agriculture and labor have borne the brunt of protection for many years, it is only fair and just that now that the chance has been held forth for development in the line of sugar production and vast sums invested in twelve states of the Union, the industry thus fostered and the capital thus invested should not be injured, either by reciprocity treaties or granting the importation of sugar and other products which compete with the output of the American farmer at reduced rates or free of duty from Porto Rico, Cuba or the Philippines."

In executive session the Association elected these officers: Henry T. Oxnard, New York, president; Julius Stroh, Detroit treasurer; R. M. Allen, Ames, Neb., secretary. It was also decided that a vice-president be chosen from each State in

which are located beet sugar factories by the factories of such State. Every beet sugar manufacturing company in the United States was elected a member of the Association.

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A WELL-MERITED COMMENDATION.

The Louisiana Planter of December 2, referring to a notice in the Planters' Monthly of his departure for Queensland, says:

"It is gratifying to us in Louisiana, who know Dr. Maxwell so well and appreciate the sterling integrity, great ability, consummate skill and untiring energy with which he pursues the solution of every problem that presents itself to him to learn the high estimation in which he is now held throughout the sugar world. During his sojourn in Louisiana at our sugar experiment station his investigations were very valuable. It is pleasant to know that our friend, going to distant Hawaii, is so highly appreciated there that the Queensland government, learning of all this, calls him in to counsel with them as to the best means of promoting the agricultural industry and especially the sugar industry of that empire that Great Britain is building up in the far east, or, looking westward, may we not say from our point of view, building up in the far west? The Louisiana Planter wishes Dr. Maxwell a delightful and successful voyage to Queensland and is sure that his experience and advice will be of great value to our British cousins and fellow sugar planters there."

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It is fortunate, says a New York Exchange, that food has not advanced in cost to the consumer as much as fine clothing has. Flour is cheap; coffee abnormally low in cost; sugar is about a nickle a pound; tea and cocoa are inexpensive beverages; canned foods, in spite of the rise, are wonderfully low in price, so that wage-earners, with time fully employed at the best wages received in many years, ought to be getting along better than usual. The present wave of prosperity is carrying the Nation ahead to a condition never before reached. It is a poor time for the demagogue or the advocates of any sort of political or economical heresy.

PRECAUTIONS AGAINST THE PLAGUE IN RUSSIA.—Consul Heenan writes from Odessa: I saw the other day a curious device attached to the mooring rope, or cable, of a steamer which was loading at this port. The cable was run through a piece of iron pipe about a foot in length, and welded on the end of the pipe was a flange, or funnel, which looked like the end of a trumpet, with the wide end facing the ship. The iron pipe was stuffed with oakum, to prevent it from slipping and also to prevent rats from passing through it. This novel construction was quite close to the ship. On inquiring what purpose this device served, I was informed that the Russian authorities furnished these appliances and obliged all ships to use them whenever they came from a port infected with the plague, in order to prevent the rats on the ship from coming on shore. It is generally conceded that the plague has been carried and spread by rats which have left ships coming from infected ports. It is known that rats make use of the cable to come on shore, and this iron pipe with its funnel-shaped arrangement was employed to prevent such visits, if possible. These devices are attached to each cable by which the ship is moored. In addition to this precaution, the master of the ship is obliged to take down his loading stages every night and erect them again the following morning, in order to prevent the rats from coming on shore during the night.—U. S. Consular Reports.

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A flood of light is thrown on the relation of hand to machine labor, in a report just issued by Hon. Carroll D. Wright, United States Commissioner of Labor. When plows were made by hand the labor cost of one plow was $5.44; by the present machine method it is 79 cents. The time required under the hand process was 118 hours; by the machine method, three and three-quarter hours. In the money cost the ratio of the past to the present is as 7 to 1, and in consumption of time as 31½ to 1. As to the reward of labor, we find that under the old system the labor received 4 6-10 cents, while under the new he receives 21 cents. And yet with such facts constantly before us, there are some who long for what they call "the good old times." And just think of how products, so cheapened, are made available to the many, instead of the few.

No new invention has ever so rapidly attained favor with the public, or advanced in its development so quietly as the automobile. Its use will not be confined to conveying people through the city thoroughfares, but it will be used for conveying merchandise to any part of the city or country. It is now being introduced into Paris for sweeping the streets. The motor is in front, while underneath and behind is a tank for water, and the sprinkling device in the rear and the sweepers, which can be raised out of contact with the pavement whenever desired. The new machine can be run back and forth over a street to sprinkle it. It will then return and sweep the dirt in piles, and electrically driven carts will carry away the dirt after it has been heaped in piles.

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Probably the most peculiar accident that ever befell a workman in a sugar refinery, was that which recently ended the life of Howard Reynolds at the refinery of the Bay City sugar company. Reynolds was in charge of a centrifugal in which the molasses is separated from the sugar and was using a hose with a spray the same as usual in cleaning out the centrifugal after the sugar had been removed, when he fell over into the centrifugal, the shaft of which was revolving 1,300 times a minute. The workmen who saw him fall, immediately shut off the power from the machine and Reynolds, ground to a jelly, was taken out. Men whose lives have been spent in sugar mills say that this is the first accident of the kind ever recorded, and how Reynolds managed to fall where he did is still a mystery to those who saw him fall, or who are familiar with the machine. The aperture through which he fell was only 15 inches wide. The theory is advanced that the man must have fainted and in falling was unable to help himself.—Mich. Sugar Beet.

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STEIN'S NEW PROCESS OF SUGAR REFINING WITHOUT ANIMAL CHARCOAL.

(Reprinted from "The International Sugar Journal," December, 1899.)

We have been favored with particulars regarding this new process of sugar refining, patented by our esteemed contributor, the well known sugar expert, Mr. Sigmund Stein, of Liverpool, England.

This process consists in the judicious decomposing of the non-sugars (both inorganic and organic) and the coloring and gummy matters contained in raw sugars. This object is attained by the proper use of certain chemicals in the primary stages of refining. We are not at liberty to specify in detail the agents which are used in this process, but may state that they are very cheap and easily manufactured, and their application to any particular kind of sugar presents no special difficulties.

The mechanical appliances are of a very simple character, and practically of no great cost, and a whole refinery can be worked entirely without animal charcoal, simply by this process and with the use of proper chemicals.

The process can be applied in new sugar works for manufacturing refined sugar direct, or in refineries for refining either cane, beetroot, or maple sugar. The processes of manufacture or refining are expedited and improved, and the individual operations more effectively and efficiently performed, while the quality and quantity of the products are also improved.

This invention consists in certain special treatment of the sugar and liquors at different stages of manufacture and in the employment of certain substances and chemicals, and relates to the treatment of raw sugar or liquors, and also the refining of sugar and sugar liquors, the effect and result being that perfectly white, clear, and bright crystals are produced by a single and inexpensive method, without the use of any charcoal whatever.

In this process there is no necessity for after-products, as all the syrups resulting from this method of manufacture can be again purified and brought back into the original working, the final products being only first grade sugar and molasses.

The molasses ultimately turned out is sold or used for distilling, or worked up by one of the known molasses-extraction processes, or used for feeding purposes. Cane sugar molasses or cane sugar refinery molasses are worked up for Golden Syrup.

The Golden Syrup ultimately resulting from this process is of a bright color, good flavor, and is appreciated for table use.

A new refinery for working by this new process can be erected very cheaply, on account of many machines being

eliminated. An old refinery could also be adapted for this process without any great expenditure of capital.

The inventor, Mr. Sigmund Stein, intends to appoint in every country agencies for this process, and will give preference to engineering works and engineers and to technical and practical sugar chemists. In each country, the factory which first adopts this process will be treated on specially favorable terms. As regards the expense of the process, we are informed that the total cost of treatment does not exceed 1¾d. per cwt. of refined sugar, and there is, moreover, a great saving in charcoal, coal, labor, machinery, interest on capital, depreciation of plant, etc.

By this process the best white crystals, cubes, loaves, and granulated can be produced without the use of animal charcoal, and very bright and fine colored cassonades (after-products) can be made.

This process will be of special importance in using very low grade sugars, specially cane sugars, as for instance: Brazil, Ilo-Ilo, Taals, Manila, Jaggery, Java Stroops, Mauritius syrups, open-kettle and native sugars, second runnings and after-products and will be particularly welcome and applicable in countries where the use of animal charcoal is precluded owing to religious objections.

To give some idea of the cost of plant, we may state that the inventor informs us that the outlay for the mechanical portion of a refinery working up 300 tons of Jaggery per week would be about £6,000.

Applications for Licenses should be addressed to the Inventor, Mr. Sigmund Stein, 323, Vauxhall Road, Liverpool (England).

[Accompanying the above, we received a plan of a Sugar Refinery for working the Stein process of refining without animal charcoal.—Editor Planters' Monthly.]

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FRANCE.—The recent tremendous rise in coal makes a difference in the cost prices of sugars of 6d. per cwt. to an average factory, and although, of course, the factories have already contracted for this season's supplies, the effect will be felt in the prices for the following campaign, or in the sowings, in case fabricants try to make the farmers bear the brunt of the increased cost of production, by bidding less for the roots.

CUBA.—Government weather report for week ending December 16th, 1899.—Rain Fall.—A deficiency of rainfall for the week is again reported and rain is needed in all districts, except northeast Puerto Principe. Wells are drying up in southwest Havana. Cane.—Ratoons are suffering in northeast Havana, in northwest Matanzas November plantings are supposed to be lost. Rats are injuring cane in northwest Santa Clara. In northeast Matanzas cane is below average size, cutting was begun on the 15th and grinding will begin on the 18th. In parts of southwest Santa Clara the crop is larger than last year, while in other parts it is 25 to 30 per cent short, grinding will begin about January 1st. In northwest Santa Clara most laborers are working in tobacco fields and grinding will be retarded, probably until February 1st. Worms are damaging cane in northeast Santa Clara. Work has been stopped in northeast Puerto Principe. Cutting will begin in southeast Santiago about January 1st.

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PATRIOTIC WORDS:—The struggling republic for which Washington was willing to give his life, and for which he ever freely spent his fortune, and which at all times was the object of his most earnest solicitude, has steadily and wonderfully developed along the lines which his sagacity and foresight carefully planned. It has stood every trial, and at the dawn of a new century is stronger than ever to carry forward its mission of liberty. He was the national architect, says Bancroft, the historian, and but for him the nation could not have formed its union, could not have put the federal government into operation. More than seventy millions of people acknowledge allegiance to the flag which he made triumphant. The nation is his best eulogist and his noblest monument.

PRESIDENT MCKINLEY.

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Nearly all the State governments have established laboratories where samples of the leading articles of food are examined by the food commissions, and when found to be adulterated, the sale of them is forbidden. In Michigan, out of 125 samples of food examined, sixty were found to be pure and sixty-five more or less adulterated. These examinations are resulting in the passage of laws imposing heavy penalties on those dealing in such goods, where the producers are not within the jurisdiction of the State.

THE DETERIORATION OF CANE-LANDS IN HILO DISTRICT.

BY E. HARTMANN.

(The following paper was prepared during the latter part of 1898, and handed to a number of gentlemen in charge of the sugar plantations in Hilo district.)

A few years ago my attention was called to several plats or pieces of land, on which the cane had a starved, sickly appearance. As a first step on the way to become acquainted with the cause or causes of this phenomenon the agricultural analysis of the soil suggested itself. Investigations carried on in this direction led to a but half satisfactory result. (See Planter's Monthly, April, 1897). While the treatment which those results pointed to (slaked lime) acted beneficially in some instances, it did not have any effect, as far as visible at present, in others; and the question as to the cause of the apparent sterility in those cases was still left open.

When starting fresh investigations on this subject, I decided to omit the analysis of the strong acid soil extracts for reasons given in the article above mentioned, and to restrict myself to the determination of the available portions, i. e., nutrients soluble in very dilute acids. The results are given below. Field A produces good average crops; B is a field in its vicinity showing deterioration most characteristically; C is a piece of new land bearing a heavy crop of young cane taken into an older field (D), which promises but a scant crop; C and D are cultivated together; E and F have been taken from parts of the district, where deterioration has so far not shown itself.

	A	B	C	D
Lime	.169	.127	.033	.030
Potash	.0120	.0140	.0087	.0083
Phosphoric acid	.0036	.0039	.0029	.0037

	G.1	G.2	H.1	H.2
Potash	.012	.026	.022	.030
Phosphoric acid	.0026	.0030	.0035	.0035
Lime	.052	.040	.028	.038

In many cases a difference in the appearance of the cane is obviously due to the situation. In perhaps most instances the depressions or hollows in our mostly undulating cane-fields

are more fertile than the elevations and sides; not unfrequently, however, the opposite is the case and the reason for this is less apparent. Two typical cases were chosen for analysis. G.1 and H.1 represent the sides of the two different depressions, and G.2 and H.2 the respective hollows. In both these cases the growth in the hollows was far behind that on the sides. On a rough mechanical separation, the samples taken from both hollows, proved to contain more clay than those taken from the sides. But the depressions are sufficiently drained, so that there is no stagnant water. Still the access of the air to the soil may be sufficiently checked by the clay and fine silt washed down from the elevations to provide favorable conditions for the growth of denitrifying bacteria.

All these analyses have not done more towards explaining the sterility of certain lands, than those made two years ago. Bad drainage, acidity of soil or subsoil and unfavorable physical conditions, are accountable for a proportion only, of unsatisfactory results. In regard to the rest of the poisoned spots, where the soil appeared normal in it's mechanical as well as chemical properties, the reason for their existence had to be looked for in another direction. The nearest cause that suggested itself, was a possible damage done to the cane-roots by some injurious insect. The decision, whether this is the case or not, lies of course in the province of the entomologist. A cursory examination of the soils and the cane-roots in such places, did not however reveal any animal life that could not be found in other, normal fields.

The only side of the question which had so far been left untouched was the bacteriological one, and indeed experiments made in this direction promised a solution, of a part at least, of the difficulty. I will enumerate here some of the typical bacteria, whose activity in the soil, principally affect the life of plants. A number of micro-organisms, the most important of which is *Bacillus mycoides*, convert all kinds of nitrogenous organic matter into ammonia, which in it's turn is acted upon by the nitrous ferment, a micrococcus known as *Nitrosomonas*, by which it is oxydised to nitrous acid. The oxydation is carried further by another smaller bacillus, the nitric ferment or Nitrobacter, the final product being nitric acid, in which form the nitrogen is ready to be assimilated by the roots. In order to test the activity of these bacteria, culture-liquids containing ammonia and the other

nutrients in small quantities, were seeded with equal quantities of the soils above described.

A, B, C, D, E, and F, seeded October 18th. On October 24th, the nitrite-reaction was about equally strong in all the flasks. On October 31st, A and E showed but a trace of nitrite; B ¾; C 1-32; D ⅛ and F a trace. On November 6th, the nitrite had disappeared in all except B, which showed still a trace on November 28th.

On November 9th, another series of culture-flasks was seeded with samples of the same soils taken at a different time. EI is the same soil as E, but while E was added to the culture-liquid in the state it was brought from the field . EI had previously been air-dried.

On November 18th, almost all the ammonia had been converted into nitrous acid in A, B, E and F, while E1 and F1 only showed ½, C and D¾. On November 28th, nitrification was complete in A, C, E, and F, while B showed only ¼ and D ⅛; E1 and F1 ½ of nitrate. On December 15th, nitrite was to found only in B and D, and here it had disappeared on December 27th. On November 19th, three parallel series of experiments were started with soils from fields A and B. The samples were taken from different spots and at different times, but A and B of each series at the same time. On November 29th, from ⅛ to 1-16 of the original amount of ammonia was left in all the flasks; the rest had been converted into nitrous acid. 2A and 3A showed already ⅛ of nitric acid. On December 5th, nitrous acid had disappeared in 2A and 3A, 1A and 1B showed ¼, 2B and 3B ½. The balance was nitric acid. A trace of ammonia showed still more or less perceptibly in all the flasks. On December 12th, no more nitrous acid in 2A and 3A, 1-16 in 1A and 1B and ¼ in 2B and 3B.

It will be seen from the above, that the period used for the nitrification of a given quantity of ammonia is not the same in all the instances. While there are no great divergences between A, C, E and F.—B and in a lesser degree, D occupied much more time for the process. This time varied but little with samples of other normal soils taken at random. The different behaviour of B and D attracts therefore all the more attention; it was limed, plowed and cultivated with special care and attention, with the same result however. It was then left to itself, with same result. It had applications of high-grade fertilizers, with no evident beneficial effect.

These experiments show that, while there was not very much difference in the time occupied in the conversion of ammonia into nitrous acid, the oxydation of the latter into nitric acid, was much slower in the case of soils B and D than in that of others, so that it would appear that the nitrosogenic coccus is present in normal number and normal condition, while the nitrogenic bacillus was lacking in activity. These observations, incomplete so far, still suggest a treatment promising success: i. e., inoculation with a culture of the nitric ferment. As this preparation is not yet on the market, and reliable information as to results obtained by such treatment are not yet at hand, another remedy had to be looked for.

For reasons, which will appear further on, green-manuring recommended itself as a possible remedy.

It may not be superfluous to show in an outline the action of a leguminous crop on the land and on subsequent crops, as reliable scientific data on this subject are of comparatively recent date.

1. In the first place stands the increase of the nitrogen-contents of the soil, whether the crop is plowed under or taken off. The *Leguminosae* draw their nitrogen-supply indirectly from the air by acting in symbiosis with certain varieties of *Rhizobium Leguminosarum* (*Bacillus Radicicola*), micro-organisms, which settle on the roots, where the form the well known nodules. Several of these varieties have been isolated by Prof. Nobbe and Hiltner of Tharandt in Saxony. Pure cultures of eight such varieties, each adapted to a certain species of leguminosae are prepared and sold under the name of "Nitragin" by the Farbwerke Hoechst A.M. Experiments made on German agricultural stations have given highly satisfactory results:—Increases in crops due to the inoculation of soil with " Nitragin," ranging up to 400%.

2. Food, which is practically inaccessible to cane-roots, is brought up from the sub-soil and thus rendered available for the former by the strong tap-root and the generally strong system of roots peculiar to leguminous plants.

3. The roots play another, even more important part inasmuch as the acids secreted therefrom accelerate the weathering or rendering soluble of the tied-up foods. Dietrich obtained some remarkable results in experimenting in this direction. He pulverized unweathered rocks, and leav-

ing some samples of this powder intact, he seeded others with Lupins, Pease, Wheat and Rye. He found the increase of material rendered soluble through the influence of the plants, in the case of lupins 20 per cent., in that of pease 16 per cent., and in that of wheat and rye only 1-3 and 1-6 per cent. respectively.

4. By the growing and plowing under of a crop with strongly developed roots and foliage, it is evident that the soil is opened up, and to some considerable depth rendered accessible to the air. This in its turn brings about conditions favorable to the growth of nitrogenic bacteria, and at the same time unfavorable to that of denitrifying bacteria.

5. A great advantage not to be overlooked, is the accumulation of the Bacillus Radicicola in the soil on account of its continued activity in assimilating nitrogen, as shown by Liebscher. He holds, and he is supported by Winogradsky and Kossowitch, that these bacteria (bac. radicic.), which have left the nodules, retain the capacity to assimilate free nitrogen. He grew a crop of sinapis alba on soil rich in bacteria, and found, that its nitrogen-contents were higher after the deduction of the nitrogen taken off in the crop than they were before. Berthelot showed conclusively in his paper on "Recherches nouvelles sur les microorganismes fixateurs de l'arote," that the action of the bac. radacic, is not exclusively symbiotic, but that the bacillus is capable of assimilating free nitrogen independently of a leguminous plant.

As stated before, the success of green-manuring depends in the first place upon the quality of the leguminous crop. As most of these plants prefer an open, sandy soil, it is to be expected that not all varieties will thrive well in this district. That the soil is well adapted for some varieties is shown by the rapid spreading of a papilionacea with yellow blossoms, resembling the species cytisus, growing in places where heretofore even Hilo-grass could not make a living. I may here state that on a few occasions, experiments on a small scale with green manuring were made in this district. These experiments ended with unsatisfactory or indifferent results, caused in all cases by the failure of the leguminous crop. This may be due to several causes, the most probable one of which is, that the species of leguminosae selected were not suited to the climate or to the variety or varieties of bacteria in the soil.

It will therefore be advisable to experiment with several varieties of leguminosae on plats treated with simple and compound non-nitrogenous fertilizers. One of their first requirements is lime, best in the shape of carbonate, a constituent in which most of our lands are rather deficient. The lime would supplement and, in a way, assist the solvent action of the roots, the lime itself being a powerful agent in rendering nutrients soluble.

It may be well to point to the fact in this place, that the leguminosae are not the only plants, which stand in symbiotic relationship to lower organisms. A large number of other plants, among which the coniferae stand foremost, have been shown by Frank to obtain part of their nitrogen supply through the medium of the white threads and accumulations, *Mycorrhizae*, which form on their roots. Besides a number of varieties of Algae act as collectors of nitrogen when exposed to the air.

Having satisfied ourselves that the reason for the sterility of certain soils lies neither in the chemical composition nor in its mechanical condition, it becomes imperative that we should make ourselves acquainted with the biological side of the question. Favorable results could logically be expected from an inoculation of old land with new soil, with a view of introducing colonies of nitrosogenic and nitrogenic bacteria of greater vitality. Inoculation of lands for the purpose of improving leguminous crops, has been practised for many years, and mostly with signal success. All this success has however been ascribed to the bacillus radicicola, the bacillus found in the nodules of the leguminosae.

It will be interesting to know the effect of a slight dressing of new land upon a soil a test of which shows a slow action of the nitroso or nitrogenic bacteria, or both. It is not to be overlooked that with such new soil, numerous other micro-organisms are introduced, some of which could possibly do damage to a crop under the changed conditions. It was for this reason that Nobbe and Hiltner substituted their pure cultures for soil-extracts, and for this reason, better success could be expected from an introduction of nitrifying bacteria in a pure state. Experiments in this direction, will be made as well as in that of green-manuring. This latter practice has been in use in another district of this island for a considerable time, with most encouraging results.

Upon my request to furnish me with his views on this subject Mr. Lidgate of Hamakua, who first planted lupins for manuring on this island, wrote in the following terms:

"I am so thoroughly satisfied with this method of partially restoring the soil to a condition similar to what we call virgin soil or new land, that I do not hesitate to plant large areas with this legume, throwing out of cane-cultivation for one year the fields so treated.

"We have a very marked example of the effects of this method as opposed to bare fallow in a field of young plant cane of fifty acres. The lupin seed used on this piece was bought from Portuguese homesteaders, and a few bags having been improperly cured, resulted in bare places, where the poor seed was sown. When the crop of lupins was plowed under, we noticed a marked difference in the spots that had no plants on them, they being of a light, dry, dusty character with no glisten to the soil, while the main portion of the field, on which there had been a heavy growth of plants looked much better, having a fresh glistening appearance and a decided grain to the soil, and after six weeks time when it was furrowed for planting, this condition was even more marked.

"Today, the field having been planted early in June, 1898, we can readily pick out those spots that were bare fallow, in spite of heavy doses of stable-manure and night-soil.

"In some fields I value a heavy crop of lupins plowed under more than an application of ten tons of table-manure per acre, its action on our volcanic soils being, in my opinion, on the same lines as nature employed to produce said soils from the aa and pahoehoe, and in a comparatively short time returns to the soil a huge mass of vegetable matter, which is rich in nitrogen.

"I do not see why we should doubt a fact which has long been established in all countries, where agriculture has been carried on in an intelligent and scientific manner, hence I do not take any credit for having success along these lines, as all planters were and are trying to obtain a plant, that will meet the conditions of their climate and soil. That I first found the lupin and recognized it as the long sought for legume suited to our conditions, was an accident * * * * It must not be anticipated, that one crop of this plant will

restore a poverty-stricken field forever, as I fail to notice any effect after the first ratoons.

"This system, you will note, has a double effect:

I. An occasional rest of one year to the land.

II. The benefits obtained from plowing in a green crop.

"Rest alone is good, but rest without a return in the shape of a heavy green crop has become a thing of the past on this plantation, and would be considered a distinct financial loss.

"Seed is the only outlay in this method of restoring fertility, as, if land is only bare fallowed, it should be plowed twice. Where lupins are used, once before sowing is sufficient, and then the second plowing when the crop is plowed under.

"Seed at 5c. per lb., say 80 lbs. per acre, would cost $4.00, sowing by hand 7c. per acre or by machine very much less. Disc-plows are used to turn the plants under, and they do it very effectually, 6 mules and two men plowing in 1 3-4 acres each day.

"The only objection, we have to lupins is that it is impossible to plow them under well with our steam-plows, thus necessitating our using teams for the purpose, when we need the teams for harvesting cane."

The opinions expressed here carry all the more weight, as Mr. Lidgate's experience with green-manuring extends over a period of several years, and large areas have been planted with lupins by him.

I am indebted to Mr. Lidgate for an ad oculus demonstration of the effects of this treatment. A ride round Hamakua Plantation with this gentleman gave me an opportunity of seeing the difference between fields, which recently had, and others, which had not, grown a leguminous crop. The comparison was in every instance in favor of the former.

Papaikou, December 16, 1898.

Since the above has been written, other analyses of soils have been made, dilute organic acids being used as solvents. The results of these analyses were of the same nature as those mentioned in the beginning of the foregoing paper, thus strengthening the evidence that the main-cause of the shortage in yield does not lie with the composition of the soil, further proof of which will be found in the following considerations.

For a number of years small quantities of imported varieties of cane-seed were planted out in plats or scattered among other cane by the plantation-managers in this district. Some varieties have given most astonishing results.

Planted on the same field simultaneously with Lahaina, the seed for which had been taken from the near neighborhood, other varieties, as in this case Yellow Caledonia and two dark-red canes, one even-colored and one striped, had a fresh deep-green foliage, and at the time of cutting the stalks measured from 1 1-2 to 2 inches in diameter and from eight to twelve feet in height, while the former's foliage (Lahaina) presented a sick yellow appearance, and the stalks (from 3-4 to one inch in diameter with half-inch joints) had barely reached a height of from one to two feet.

We find that these canes are coarser, of more robust build than the Lahaina. The action of their roots may consequently be expected to be more vigorous and thus able to take up food, which is of no value to the more delicate Lahaina-cane. This, however, although undoubtedly an important factor, cannot wholly explain the situation, for, if it did, then these yellow and red canes would give larger crops than Lahaina everywhere, which we know not to be the case. What, then, is the cause of this peculiar behavior of the soil? The foregoing report suggests the answer to this question.

We have seen, that the roots of the legumes co-operate with a certain bacillus (bacillus radicicola) in the assimilation of their food. This co-operation, termed symbiosis, has been studied for many years. Several varieties of the bac. radic. have become a commercial product, and its value for the inoculation of the soil before seeding with legumes is no longer disputed. In the case of the bean the introduction of the bac. radicic (bean) from a healthy bean will often cause land, which has been unresponsive to other treatment, to become very productive,—of beans. Upon this fact is based the commercial success of the pure cultures of the bac. radicic. known as "Nitragin."

We have here a complete proof, that the failure of the crop was not due to the chemical or mechanical properties of the soil, but to the impaired activity of a certain bacterium. Returning to the cane we are confronted by the fact, that certain newly introduced varieties of cane. or the same variety of cane grown under different circumstances, will, when cul-

tivated under the same conditions on the same land with the old seed, produce a very much heavier crop than the latter.

Is it not more than probable, that the same causes produce the same effects in the case of the cane as in that of the bean? The process or processes of nutrition of the cane have hardly been studied at all. From observation of the growing cane we know, that the principle of its nutrition must be similar to that of the nutrition of the bean, in other words, that the cane must act in symbiosis with some special micro-organism in the process of taking up its food. This leads to the conclusion, that the roots of the unhealthy cane have to some extent lost the power of acting in symbiosis, of working hand in hand with certain micro-organisms in the soil, or that, as in the case of the bean, continuous cropping of the land with the same cane has weakened the affinity of such organisms for that cane. These considerations point to two modes of treatment for land such as described.

1. By introducing into the soil the required bacteria, a treatment, which may or may not be practicable under present conditions.

2. By replacing the old canes with some new varieties, which have been shown to thrive, or the same variety grown under different conditions. This, as mentioned before, has been done in this district with remarkable success.

The varieties, which have given such satisfactory results are the Yellow Caledonia (I), further a claret-colored heavy cane (II), and a striped variety (III) in other respects similar to II. The origin of these latter two varieties is not certain.

The density and purity of these canes is a little lower than that of the Lahaina. The difference is quite insignificant, though, when compared to the difference in yield.

	Lahaina.	I.	II.	III.
Density, Brix	20.00	19.10	18.75	19.70
Sucrose	19.20	17.82	16.96	17.97
Purity.	96. 0	93. 3	90. 5	91. 2
Glucose.	.29	.36	.51	.40
Glucose-ratio.	1. 5	2. 0	3. 0	2. 2

These figures refer throughout to good, ripe cane of equal age.

In last year's report I laid great stress on the value of green-manuring. Several seeds were tried in the district; but only the Lupin took root at all, and the plants, when plowed in, were very small, so that much beneficial effect can hardly

be expected. This is very much to be regretted, as the effects of green-manuring as set forth in an earlier portion of this paper made this treatment appear eminently suited to this district. Some cultures of "Nitragin," ordered from Germany, arrived here dead, although sent by mail. (The life of these cultures, as packed, is only from three to four weeks under the most favorable conditions.)

The cause of the failure of the leguminous crop was probably the lack of available lime in the soil, as such plants particularly require a liberal supply of lime. If we assume a similarity in principle between the mode of nutrition of legumes and that of cane, and we consider, that lime is one of the first requirements of the former (see above), we find another reason added to those already given, why we should supply our land with lime. Carbonate of lime in the form of ground coral, shell-sand or chalk is most suitable.

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SUGAR HOUSE WORK IN LOUISIANA.

An Address Read at Sugar Planters' Meeting at Houma, September 30, 1899, By H. G. Bush.

The subject given me today, "Sugar House Work," covers an area of such vast proportion that it can be dwelt upon but imperfectly in a paper of this reading; and therefore I will confine myself almost entirely to the mechanical conduct of work in sugar houses.

The machinery used in the manufacture of sugar has improved in this State to a degree almost beyond belief, in the past ten years, as the following figures will show: In the season of 1888-89, 776 sugar houses were running in Louisiana and made 742,000 barrels of sugar (counting hogsheads). In the season of 1898-99, 349 sugar houses were running and made 1,510,000 barrels of sugar. In other words less than half of the sugar houses, in 1898, made more than twice as much sugar as was turned out in 1888.

I venture to say that no mechanical revolution so great as this has ever been accomplished in any other industry in so short a time. This vast improvement in sugar manufacture is all the more wonderful when we take into consideration the immense first cost of sugar making machinery, and therefore it was some very pressing necessity which led to it. Of the causes for this change, two in particular can be cited.

First—The constant decrease in the value of sugar made necessary the latest and most improved methods in manufacture and compelled the lessening of cost by increasing the capacity of the houses. The sugar manufacturer, like all the manufacturers in other lines, found that in order to work upon the narrow margins allowed him, an immense amount of work had to be done accurately and quickly, and as large an out-put was the only way to overcome the small working margins, and as labor saving machinery was imperative, we had the old axiom exemplified, of the survival of the fittest. Many of the smaller sugar houses were abandoned and the centralization of the industry was a natural consequence.

As a result of this centralization, vast saving in labor was accomplished. One item alone which came under my personal notice may be of interest. Eight years ago, twenty-one sugar houses on Lower Terrebonne and Little Caillou Bayous worked 218 men per watch for putting cane on the carrier. In 1898, the Lower Terrebonne factory ground the cane formerly ground by these twenty-one houses as well as 1,900 acres of cane in addition and worked ten men at the carrier per watch.

Second—The sugar planters of the State began to realize the importance of the manufacturing part of the business and to give some little attention to the sugar house. We all know that formerly we would bend every effort to the planting, cultivating and saving of our crops and allow them to be butchered in the sugar house.

I should say that the mingling of neighbors, meetings of the planters throughout different parishes and the interchanging of ideas, has been the most potent factor in the change to present methods and in perfecting the subject under discussion; and in this connection I wish to congratulate the sugar planters of Terrebonne upon this initial step in that intercourse which will be of immense benefit to us all, and I hope that the beginning of today may make positive the formation of some association and meeting place where we can actually become acquainted.

Probably no industry has withstood such vicissitudes or fought against such odds as ours has, but perhaps the ordeal which we considered the greatest, accomplished for us the most good in sugar house work. I refer to the repeal of the Bounty Law. This repeal was the turning point in sugar house management. We were all forced to study the manufac-

turing part of our business from the ground up, and when the lesson was thoroughly learned, we cast aside the services of the middle man; we knew, ourselves, what we wanted and needed, and bought it. We all remember the old style of buying what we wanted. The plan was to figure upon the mechanical work we had to do, and the foundryman was given carte-blanche to figure on the machine to do it. I need not add that the foundryman's figuring was generally preceded by the dollar sign.

What a difference there is today when almost every sugar manufacturer in the State can, being given the number of tons of cane to be ground per day, probably itemize a list of the machinery required to do the work. Often have I been amused at remarks like the following: "Why, sugar house men have a snap—you only work three months in the year and then have nine months to rest." It is not necessary for me to tell you how great a mistake this is. Sugar house work begins the day after the grinding is finished. The laying by of our plants is of great importance, and to my mind, determines the proper or improper conduct of the factory for the following season, and yet how often do we neglect this task. Probably no season is so trying to the sugar house man as that in which the laying by is done. The factory manager and all the employes under him are worn out and anxious to get home, and this is the time when rigid inspection and thorough work is imperative. To properly lay by a sugar house is not the work of one day or two days but of one or two weeks. For example, take the laying-by of the mill engine which ought to be done in the following manner: Take off the cylinder-head, oil and wrap in cloth; remove the piston rings and springs, dry them and oil well (care must be taken not to bruise them in any way,) wrap in cloth and put in some safe place and tag them. The piston rod should be left in place and this, with all the other working parts of the engine, well oiled and covered with cloth. Connections to all water drips should be broken and all dampness removed from inside the cylinder. The steam chest joints should be broken, all drip plugs should be loosened, and in oiling the working parts of the engine the fly-wheel should be turned by hand a revolution to insure the proper oiling of all the parts. The centrifugal engines, the dynamo engines and all the pumps in the house should have like treatment. A very important thing is to remove all dirt,

pieces of packing and water from the cylinder and steam chest and be sure nothing is left in them which might corrode. Should the cylinder heads be left on, as some prefer, they should be loosened so that the air may freely circulate and keep the inside dry. In oiling milled work, or bright work, or the working parts of engines or pumps, I have found axle grease an excellent and inexpensive substitute for white lead and tallow, and often their superior. It is a thorough protection against rust and easily applied and removed, and can be used on all bright work in the sugar house. Vacuum pans, double effects, and centrifugals need close attention and thorough cleaning, the centrifugals in particular must be put away in first-class shape. The laying-by of boilers is probably neglected more than anything else in the house, and yet we all realize the importance of doing this job perfectly. I have found the following satisfactory: Dry and thoroughly clean the inside and then fill with water to the top and pour in one or two buckets of heavy black oil; allow the water to run out slowly and the inner walls and tubes have an oil coating which lasts the summer through and which is condemned only by the Boiler Insurance Inspector who is obliged to get inside. All the ash around the mud drums must be taken away immediately after grinding.

The piping of the house needs special attention and if it is not put up so that it can be easily drained and cleaned and the scales taken out, joints will have to be broken. In this connection I have found the elimination of elbows in piping a great saving. Instead of an elbow use a tee and a plug. In this way pipes can be drained or cleaned or extended without taking down whole lines of it.

All the belts in the house should be stretched full length and not rolled up for summer as many do.

A sugar house man after accomplishing a proper lay by can tell exactly what repairs are required for the following campaign, and his summer work can be perfectly systematized; he knows every cylinder to be bored, every valve cracked, every stud bolt or nut wanted.

The repair work in the sugar house can better be done by a few competent men over a long period of time rather than by a crowd and a rush.

While on this subject, I wish to mention what I consider one of the most important considerations in sugar house work:

the matter of employes. There is no shadow of a doubt that millions of dollars have been lost in Louisiana through the incompetency of employes.

We have all at some time or another owned a fine horse—sugar men cannot resist a good horse—what did we do the first day the animal came? Send out to the quarters for a 15-year-old nigger boy to feed and drive him? Not much. We drove him ourselves or placed him in the hands of an expert. Who is going to feed and drive our good engine, costing twenty times as much as the horse? Do we know that he is an expert?

A cheap employe is expensive in a sugar house at any price, (I refer of course to the skilled employes), and should I be called upon for a definition of a model sugar house, I without hesitancy say, one which is equipped with the best machinery in the market (not necessarily the most machinery), and having each separate machine over capacity and also equipped with the best skilled employes in the market—each separate employe over capacity.

The men around a sugar house from the manager down, should be all-around-men—no man with a hobby wanted. I saw a manager once who was a hobbyist on fuel. This fuelist dwelt for days and days around the coal pile and saved three or four barrels of coal every day, while 50 barrels of sugar per day were gliding serenely down the slop ditch. A good chief engineer will be as much concerned in the successful operation of the sugar making department as he is in the running of the mills. No painful complaint escapes him that the pan men are using all the steam in the sugar house, and I have also seen a good sugar maker rush to the boiler fronts occasionally to find out the consumption of fuel. After seeing a sight of this kind, a manager can gleefully walk over to his house and eat a good dinner. There is no necessity for two departments in sugar house work clashing and yet we know this happens 99 times out of 100; it happens because of the incompetency of the heads of one or both of the departments. The following is a pretty fair rule to go by: The man in a sugar house who blames another is himself at fault. The fuelist I spoke of just now I hope has changed the piping to his slop ditch, for in no well regulated sugar house is it possible to flow any-

thing in to the slop ditch. A key in the manager's pocket should open the way for all slops.

Starting up a sugar house should be done carefully and slowly. If you awaken a fellow who has been asleep for a long time by striking him a tremendous blow on the soles of his feet, his nervous system will probably be shattered. I have seen sugar houses started in this way and it reminded me of opening a full valve of a hundred pounds of steam on a new engine. A competent engineer will start an engine which has been idle for some time as follows: He looks over the engine, puts the wrench on cylinder-head bolts and all other bolts, examines the wrist pin, feels the tightness of the governor belt, oils the working parts, fills the oil cups, opens the cylinder cocks, opens exhaust valve, turns over the fly-wheel by hand at least a full revolution, cracks lightly the feed valve, opens the valve slowly, cautiously, and slowly the engine wakes from its long sleep; he quickens the life and motion in it and then after 12 or 15 minutes shuts off the steam again. Every bearing, every surface, every pin is examined and felt, every oil cup is tested; he looks at the sight-feed and every oil bearing surface, then he starts the engine slowly again and it is ready for work. Start your sugar houses in this way.

To make a trial a week before grinding and pump water through all the pipes and try all the pumps and engines is none too early. This may save a week in the midst of the busy season.

In taking the sugar house work through a grinding season, I have been requested to give the equipment of the Lower Terrebonne factory. The equipment is as follows: One Bodley-Mallon carrier feeder. One six foot Krajewski crusher. (Allow me here to pay tribute to best thing that ever happened in a sugar house—the crusher.) One six roller Reading mill, both mills 6′6″x32″, straight tooth gearing, driven by a 24x48 Reading slide valve engine. Fifteen clarifiers. One ten foot Standard double effect. Eight filter presses, 500 sq. ft. each. Three eight foot vacuum pans. Ten 30 inch centrifugals, and two 40 inch. Seven hundred and fifty sugar wagons. Four bagasse burners arranged in batteries of two boilers each. Two batteries of coal burners of two boilers each, the total boiler capacity being about 1,040 HP in actual

service. Four hundred and ten cane cars. Three narrow gauge locomotives. Sixteen flat boats and one tug.

The interior plantation stations are served by rail where a railroading system is carried on just as on a standard road. Stations along the bayou deliver to flat boats under the same system.

As 104 planters delivered cane daily to the factory, each train load and barge load is rechecked at factory with the bills lading before turning them over to the scale man, who in turn hands them into the office with weights attached, daily. Any one of the 104 planters can get his weights the day after the delivery of the cane. The factory buys cane on the basis of so much per ton for each cent value of sugar, and I have figured that to buy our daily delivery on test would require the services of about 15 chemists and assistants and do the task imperfectly. From time to time the cane from the cars of each planter is tested.

The service to the carrier is accomplished by one locomotive and the empty cars drawn out by a drum at the head of the carrier.

As the average tonnage ground is 1,050 per day and the average car load about 2 3-4 tons, this drum pulls out about 16 empty cars per hour.

Now we come to the place where every revolution counts. Standing off and looking at a well set mill taking in large quantities and huge chunks of sugar cane with hardly a murmur or creak, the novice cannot realize the great care and serious thought which must precede this smooth action.

In the first place, the basis of good operation is to know exactly the tonnage one wishes to grind, and when the mill is properly set for this tonnage, no other will answer, and setting the mills for this tonnage does not merely mean the setting of the turn plates at certain distances from the rolls, or the rolls certain distances from each other. It means that one must be familiar with the cane to be ground and must have decided exactly the speed at which the mills must run to get the best results from the cane and also from the bagasse burners. I have sometimes found that the increase in speed over a certain happy medium, while done at the loss of one or two or three pounds of sugar per ton was more than paid for by the saving in tonnage ground and the saving in fuel. I mean the actual saving in fuel from the increased sucrose

left in the bagasse. In other words, there are times when one pound of sugar, worth in barrel four cents, will be worth six or eight cents in the burner. This is of course not often and I do not advocate throwing away the pound unless a two pound gain is certain.

I will not impose upon your good nature and patience by going into detail work throughout the sugar house, but will mention, in closing this paper, a few items which may be of some interest.

Blackboards put up in different departments to jot down any unusual occurrence and especially to note each and every stop and the cause of the stop, will be found of immense value to the manager who should, after each season, have an accurate record of every day and almost every hour of the grinding.

I have simplified the making of my annual record by having each department make report daily at 6 a. m., therefore at the beginning of the day we have before us: The R. R. engineers' reports; the scale men's reports, with weights and bills lading attached; the chemist's report with copies of analyses attached; the chief engineer's report, copies of stoppages and causes for same attached; the chief sugar maker's report; the sugar weigher's report with weights attached. These all condensed and placed in annual record make interesting reading and any fault or weakness in any one link in the chain can be seen at a glance and remedied.

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1390 Sicilians for Sugar Plantations.—Two shiploads of Sicilians arrived one day this week, with the above large number of laborers, mostly booked in advance, it is said, for sugar plantations. We do not credit the assertion, as it would be in violation of law. However, no doubt they will all readily find work on the sugar plantations. This is the largest number of that class ever arriving here in one day.—La. Planters Journal.

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EUROPEAN SUGAR TAXES.

A recent issue of the London Produce Market Review says: The taxes on sugar are so excessive on the continent, as to greatly lessen its use there, while at the same time it is cheapened abroad by the export bounties. Continental

economists are beginning seriously to consider what is likely to be the end of this strange position, especially as foreigners heavily tax the teas, coffees, and cocoas with which sugar is so largely consumed elsewhere. The Journal des Fabricants de Sucre points out that those commodities pay three times in France what they pay in England, and then goes on to remark:

"This question concerning the reduction of taxes on cocoa, tea, and coffee should not only be of interest to France, but also to Germany, Austria, Belgium, Russia, etc.; in short, to all such countries which, like our own, produce a large quantity of sugar, but consume only a little. In Germany the duty on coffee is about 20s. per hundred weight (instead of 62s. 6d. as in France); the result is that the consumption of this commodity is considerably progressing; from 2.38 kilogrammes duty on cocoa in Germany is 17s. 6d. instead of 41s. 6d. in France. Austria, which also levies heavy duties on tea, sugar, and cocoa, only uses these commodities in limited quantities, and the consumption of sugar suffers considerably thereby.

"In Switzerland the case is similar, tea paying the modest sum of 16s. per hundred weight, while the duty on coffee is only 1s. 5d. and on cocoa 5d. On the whole the individual consumption of sugar is on the increase in those countries where the duty on tea, coffee, and cocoa is low. Tea seems to have a specially favorable influence on sugar, where the consumption of the former is large. Belgium, for instance, taking, without doubt, this fact into consideration, abolished in 1897 the duties on tea and coffee, in order to increase the consumption of sugar, but unfortunately the Belgian Government has not entirely carried through this reform; it has maintained, up to the present, rather high duties on sugar, and the object in view has not been attained. It was recently proposed in Germany to reduce the duty on tea and cocoa. The Deutsche Zucker Industrie, an authorized review of the German sugar industry, has, a short time ago, made a proposal to the effect that this should be done when the approaching revision of the Customs tariff takes place.

"At a meeting which was held recently at Breslau (Silesia) by the Association of German Sugar Merchants, a sum of 100,000 marks was voted in order to study and bring into use the means likely to increase the sugar consumption in Germany. A special commission was entrusted with the study

of this question, which has now been completed. It is quite clear that if the problem of the consumption of sugar is put forward in Germany it will not be long before the same is done in France, where the production may shortly reach a milliard kilogrammes (a million tons), while the home consumption remains always at about the same level, on account of the heavy duties on tea, cocoa, and coffee."

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SEEDLING CANES IN BARBADOS.

It is very interesting to notice how year by year the interest in seedling propagation increases, and the search for the best cane taken up wisely and systematically by many independent observers. It was found that the soil and climatic conditions of a single place like Dodds could not always give reliable results as to the value of any particular seedling. The famous Seely seedling which was rescued by Mr. G. A. Seely, and which has given such splendid results in the red soils of Mount Wilton and Colleton, is a case in point, for it utterly failed in the black soil of Dodds. Dr. Morris has established, we believe, experimental stations throughout the Island, thus carrying on and increasing the experimental stations initiated years ago by Professors Harrison and d'Albuquerque. It is well that such good work as the propagation and feeding of sugar cane should be in the hands of competent authorities; but it is very pleasing to note that here and there throughout the Island, the private and independent observer is also taking his part in the great work of improving and rehabilitating the Sugar Industry. A recent visit to a farm of some twelve acres, beautifully situated on a plateau somewhere towards the East where the black and red soils mix, so as to form a soil capable of producing anything that will grow in the tropics, afforded us an object lesson of what can be done with a few acres of land when it fortunately falls into the hands of scientific intelligence. The chief feature of this farm is the great care taken of seedling canes, which are carefully planted and arranged, each one ticketed as it were with its history and performances. We noticed some ten varieties planted on their merits, on which perhaps planters would do well to keep an eye, amongst them a very famous Demerara seedling, D. 145, the best dark skinned variety we have seen, characterized by a strong and healthy growth, fairly rich in

sucrose, with an average yield per acre after 2 years trial of 8860 lbs.

There, too, was 147 in all its glory, one of the best all-round seedlings yet produced, and other strong growing, freely bunching and vigorous varieties of various shades of skin as B. 156, B. 208, D. 130, B. 109, D. 115, and B. 376. The last mentioned amongst its other good qualities is said to stand drought well, an admirable quality where rainfall is fickle.

Private experimental stations like the one described are of inestimable value; they carry on useful work, materially assist the recognized authorities, and help the planter in the practical work of selection, a very important matter, when in the busy planting season he is running about the country excitedly in search of the right plants, at the eleventh hour. Private or public plots properly conducted are a boon indeed to encourage and support them; there the planter can find what he requires without trouble, labelled and ticketed with the most recent and reliable information.—Barbados Agricultural Reporter.

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COFFEE APPEARANCE vs. FLAVOR.

The importance of developing a profitable coffee trade in these days of large sales and small profits cannot be too strongly emphasized. There are grocers who are satisfied to sell cheap package coffee at next to no profit, and go without a reputation for selling fine coffee. There are others who believe in quality as the first consideration, and that a reputation for keeping the finest coffee brings trade to a store, and is not incompatible with a generous profit. Bearing upon this matter is the interview printed below, with one whose twenty-eight years of experience with some of the largest and best firms in the trade give to his words great value. We insert the following in an interview with Daniel K. Young, of Baker & Young:

We cannot understand why a very large majority of the retail grocers make the serious mistake of buying coffee on its appearance rather than for its drinking quality. We maintain that this is radically wrong, and in our business we sell roasted coffee on its merits in the cup and not its appearance in the bean.

A customer goes into a grocery store for a pound of coffee and asks to have it ground. The grocer turns it from the scales into the grinder, and the customer never sees it until it is ground. All coffee looks alike when ground, and yet the grocer will buy his coffee because it looks well rather than because it drinks well, and will pay more for a good-looking than for a good-drinking coffee. This is one reason why so many consumers say "it seems impossible for me to get a good coffee in the neighborhood." From experience we know that the retailer who pays every attention to the drinking quality of a coffee when buying, and very little attention to its appearance, will largely increase his trade in the article.

Mocha is one of the smallest bean coffees grown and one of the meanest looking when roasted, and yet it is of very fine flavor, while Liberian is the largest bean coffee that is grown, and yet absolutely useless for drinking purposes.

We have many customers who at first are timid about taking this new departure, but whose trade in coffee has doubled and even quadrupled by following our advice in this direction. The fact that we never hear any complaints from the consumer, who is the retail grocer's customer, makes us aim rather to please the grocer's customer than to please the grocer himself; for so long as the customer tells the grocer that he wants coffee like the last which was sold him, we are satisfied to have the grocer complain of the appearance of the bean. Indeed, so particular are we about the drink of a coffee, that in all our blends every lot is tasted in the cup, both separately and in combination, and not tested, as others do, by pouring hot water on the grounds, but is made just as it appears on the consumer's table. We are thus able to guarantee every pound which leaves our place. This matter of Appearance vs. Flavor is not confined to coffee.

The small, wild strawberry is far superior in flavor to the large, highly-cultivated one, although the latter is much handsomer.

The handsome California peach bears no comparison to the smaller but better-tasting Delaware peach, and the "Flemish Beauty" pear does not please the palate nearly as well as the almost contemptible-looking Seckle pear. Moreover, there may be two coffees from the same country, which look exactly alike when green and when roasted, yet there will be a

very large difference in flavor between them, sometimes reaching 5 or 10 cents per pound.

Why should the retailer not buy fine-drinking coffee when it may be bought at the same price as the poor one, and let customers have the benefit? The test of tea is in its cup quality, and we cannot understand why that is not made the test of coffee. These remarks may appear self evident to the consumer, who does not understand how the retail grocer is influenced in his purchasing a given coffee having a large size of the bean, smooth, even roast and being free from what is technically known as "quakers" or light-colored beans, and yet not compare in flavor with small-bean coffee, having a rough roast and a few quakers. This foolishness on the part of the retail grocer has obtained through the greater foolishness of grocery salesmen with a superficial knowledge of coffee, and who, in selling coffee of good appearance, compare it in the hand with coffee in the grocer's bin, pointing out the difference in the size of the bean, evenness of roast, etc., but saying nothing about the drinking qualities; consequently the retail grocer comes to believe that because a coffee looks well, it must drink well, and no greater fallacy exists in the grocery trade.

Our advice to a retailer would be, if you want to increase your trade, buy your coffee because it drinks well and not because it looks well.

We are selling a coffee at 20 cents a pound, which we guarantee to be composed of only the finest drinking coffees grown in the world, and yet we frequently see in retail grocery stores coffees labelled 40 cents per pound, which, while they are of large bean and handsomer appearance, do not compare in flavor with the coffee mentioned above.—The American Grocer.

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THE CANE BORER IN TRINIDAD.

In Trinidad, the rind fungus is generally present more or less, and cane fields which do not show a single rotten cane may be found to be infected, if they are carefully examined. It has been shown that Tricosphaeria sacchari is an organism which can exist as a saprophyte, but in certain seasons and under certain conditions it appears as a parasite also. Canes left to dry in a laboratory almost invariably develope Trico-

sphaeria, the chains of macrocondia being found in the dried-up inner cells, while the microconidia, or Rind Fungus, developes from pustules in the "rind" itself. One of the best signs of its presence (to the naked eye) is the red coloration of the leaf sheath of the cane. The fungus may exist throughout a field and yet not a single cane be destroyed; but given the weather, the season, and certain conditions of land, and the fungus will enter the canes and destroy a large percentage from each stoll, sometimes as much as 50 per cent. of the crop upon the ground, as seen in Mr. Watt's return.

A study of the organism shows that it enters the cane at the base of the leaf stalk, and pierces the node or joint at the tender points which exist in these parts. It follows, therefore, that those planters who keep their canes well cleaned, or "trashed," in most weather, may expect to suffer less than those who accumulated leaf sheaths of rot and fall of their own accord.

Entry by the borer cannot be guarded against so effectively, but even the borer will be found in most instances to enter the cane under the protection of the leaf sheath.

The planter who leaves large quantities of rotten and fungus-infested canes upon the ground, and treats them rather as good manure than as material to be destroyed, is certainly one who may expect an attack of Tricosphaeria when the season is a suitable one for its development.

The immunity which is described by Mr. Watts as pertaining to the Caledonian Queen Cane is a marked feature, and one which has already been duly recognized by cane raisers. Let a cane be ever so fine, ever so sweet—it still must be condemned for cultivation purposes if it shows a tendency to acquire disease of any kind, and especially if it shows a tendency to favor the spread of Tricosphaeria sacchari. The qualities of a good cane may be estimated from the following stand-points of a cultivator and manufacturer:—

1. Good cropper.
2. Upright grower—does not fall.
3. High sucrose yield.
4. High vitality.
5. Non-liability to disease.
6. Fair fibre in megass and medium percentages of it.
7. High percentage of juice.
8. Early maturity.

9. Easily crushed—"mills well."
10. Juice easily clarified.
11. Flinty rind.
12. A cane that ratoons well.

About these points, much might be said, but a few words will suffice. The first point no one will dispute. As to the second, it is fairly clear that a cane not liable to fall, has numerous advantages over one which becomes badly "laid." The third point is a necessity, as no cane can be first rate without a high sucrose yield. A large yield of juice with a low sucrose yield is expensive, as so much more material point (viz.), high vitality, perhaps, requires explanation. It has been found that when putting in various kinds of "plant canes," that the cuttings of one variety have much more vitality than those of another. I have in my mind now six rows of selected canes. The first, and what is said to be the best, will require supplies to the extent of nearly 60 per cent., while the next variety will take only some 5 per cent. of supplies. This vitality is well seen in D 78. When this cane is planted, hardly a cutting fails to grow while with others, blanks are variously numerous. The fifth point of "non-liability to disease," is one of great importance. The sixth point is essential where, as in Trinidad, the work of the factory is done by using megass only for fuel, and there should be a medium percentage of this material, or the cane could not stand in the field, (point 2) or go well through the mill, (point 9). The seventh point is obvious, for unless a paying percentage of juice is given there would be no profit. The tenth point is an essential one, for it is clear that it would be useless to grow canes that would not make good sugar. Point 11—the flinty rind—not too thick—is a cane which defies borers; therefore this must be taken as a good quality provided there is not too much of it—which the grower must judge from actual experience. It will be seen therefore, that there are twelve or more good qualities to be considered. There are just as many bad ones, if not more, which have to be studied by the cane raiser before he can make his selections properly. After all these are disposed of, there is still the elements of chance, choice, and prejudice, to be considered. I do not for one moment think that the canes I choose, or select would all be chosen or selected by Messrs. Jenman and Harrison or by Messrs. Bovell and D'Albuquerqe and vice versa—but in this I see the greater

chance of reaching the end in view, which is, I take it, the raising of a set of canes suitable for various soils, and various climates, many per cent. better than those now generally cultivated.

Our Trinidad seedlings this year are of the highest promise —and a decided improvement—so that it is to be hoped this state of things may steadily go on till we get the 20 per cent. yield which every planter would like to see.

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BEET SUGAR INDUSTRY IN EUROPE AND AT HOME.

Special to New York Commercial.

Washington, Nov. 30.—The manufacture of beet sugar is conducted without Governmental supervision in this country, and any exact account of its cost is inaccessible. To show what it may be, with large experience and the highest skill and management, the mean cost of manufacture in 113 German factories is given:

Mean capital invested, factory		$193,400.00
Total receipts for sugar, molasses and pulps per ton of beets		11.10
Mean cost of beets per ton of 2,204.62 pounds	$4.90	
Salaries per ton	.26	
Labor per ton	.73	
Interest on investment per ton	.36	
Coal per ton	.63	
Miscellaneous expenses per ton	.96	
Total expense of manufacture per ton		7.84
Profit per ton of beets		$ 3.26

The mean net profit for each factory was $34,240.

The cost of building a first class beet sugar factory is much greater than is commonly supposed. From the most reliable data at hand it may be stated that in Europe the cost of erecting a factory with the most modern machinery, of a capacity of at least 300 tons of beets per day, is about $200,000. In this country it is probable that, owing to the increased cost of transportation and the higher price of labor, the cost of a similar factory would be at least $250,000. It is not advisable to attempt to manufacture beet sugar with smaller factories, or with machinery and appliances which do not represent the latest improvements.

It is seen from the foregoing paragraph that the farmer can have no reasonable hope of successfully establishing a home beet sugar factory. It is not just, however, that he should be deprived of any co-operation in the process of manufacture or a reasonable share of the profits arising therefrom.

The methods which have been practiced in Europe for securing these results are probably those which will eventually come into use in this country. The co-operative sugar factory, in which the farmers growing the beets hold a part or the majority of the stock, realizes the desired end.

The growers of beets holding shares in the factory have a greater interest in its prosperity, try to grow better crops and to secure in every way a higher yield. The co-operative factory renders impossible those disagreements between capital and agriculture which do so much to retard the progress of the farmer against the factory.

To show the extent of the participation of shareholders in factories in the growing of beets in Germany, it may be stated that of the 11,672,816 metric tons of beets delivered to the German factories in 1895-96, 2,689,004 tons were grown by shareholders.

It is customary in Europe, especially in Germany, to guarantee a certain proportion of pulp to each farmer who is a shareholder in the factory as part compensation for his beets and to pay other farmers not receiving pulp a somewhat higher price, approximately 75 cents per ton. The shareholders contract to furnish the beets from a certain area, and can depend upon receiving pulp in proportion to this acreage. The beet is, moreover, in such demand that farmers not shareholders contract to plant a certain acreage of beets and are then also supplied pulp as part compensation.

The pulp is especially prized in the sugar producing sections for feeding milch cows. The general results of such feeding are a large flow of rich milk and the production of butter of good flavor.

The consumption of sugar in the United States has more than doubled since 1881. The consumption by years from 1881 to 1898 is as follows:

Year.	Tons.	Year.	Tons
1881.....	993,532	1890.....1,522,731	
1882.....1,061,220		1891.....1,872,400	
1883.....1,170,375		1892.....1,853,370	

1884	1,252,366	1893	1,905,862
1885	1,254,116	1894	2,012,714
1886	1,355,809	1895	1,949,744
1887	1,392,909	1896	1,940,086
1888	1,457,264	1897	2,071,413
1889	1,439,701	1898	2,047,444

Out of a total consumption last year of 2,047,000 tons, the United States produced only 317,447 tons of cane sugar and 33,960 of beet sugar, while we imported 1,639,037 tons of cane and beet sugar. The consumption of sugar by the United States and all the countries of Europe for 1895, the latest figures obtainable, is as follows:

	Population.	Pounds.
Germany	51,650,000	26.78
Austria	43,456,000	19.81
France	38,800,000	30.61
Russia	100,239,000	10.94
Holland	4,732,000	31.30
Belgium	6,325,000	22.50
Denmark	2,300,000	45.41
Sweden and Norway	6,873,000	24.95
Italy	30,724,000	6.65
Roumania	5,800,000	4.03
Spain	17,650,000	13.68
Portugal and Madeira	5,082,000	12.92
England	38,927,000	86.09
Bulgaria	3,310,000	8.88
Greece	2,235,000	6.26
Servia	2,256,000	4.01
Turkey	21,983,000	7.65
Switzerland	2,895,000	44.66
Europe	385,177,000	25.64
United States	69,753,000	62.60
Totals	454,930,000	31.07

The quantities of sugar produced in Europe for 1898-99 are as follows:

Germany	1,710,000
Austria	1,040,000
France	830,000
Russia	750,000

Belgium	220,000
Holland	150,000
Other countries	155,000
Total	4,855,000

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CHINO SUGAR CAMPAIGN ENDED.

Close of a Successful Run.

At 12:30 o'clock on Tuesday morning a prolonged whistle from the sugar factory announced to the people of the valley that the sugar manufacturing season was at an end in Southern California, the Chino factory being the last of the three to shut down. The big building is now cold and quiet, the silence seeming unnatural after the busy hum of a sugar campaign.

This ends, in some respects, the most remarkable campaign this or any other American sugar factory has ever had. It was not a long season, but complete in every respect in its success. The campaign lasted 65 days, and during that time there was not a single break-down or hitch in the work. The machinery was never stopped but for the regular cleaning. More than that, every pound of sugar made was marketable, none having to be remelted, and none but the highest quality going out. The first pan made at the commencement of the campaign was first-class white granulated, and the last pan on Monday of this week was the same high quality. No yellow sugar, syrup nor any extraction in process is held over, but all cleared out of the factory in the form of first-class marketable sugar. This is a record never before made by this factory, and so far as we are able to learn, in any other American factory, there usually remaining some quantity at least of yellow sugar to hold over to the next campaign or shipped to a refinery.

The campaign commenced on August 26 and the last beets were sliced on Sunday evening, October 29. There were sliced per day an average of 725 tons of beets. The sugar percentage was high, running much of the time over 17 per cent and keeping well up to the last.

The following are a few items of the campaign kindly furnished us by the management:

Tons beet sliced	44,336
Pounds sugar produced	12,956,400
Paid for beets, over	$ 225,000
Paid for labor	$ 60,000
Men employed	350
Barrels oil used	50,000
Tons coke used	900
Tons lime rock used	9,000
Sugar bags used	129,661

Besides these materials, the factory used thousands of yards of filter cloths and other necessaries in the work. There was some molasses from last year and several cars of raw sugar also worked.

Since the close of the campaign about 200 men have been retained for the work of clearing and repairing the machinery. That force will now be reduced, however, to probably about one hundred men. The work of cleaning and repairing will continue until the factory is in ship shape, when it will await the opening of the 1900 campaign, which all hope will last five months instead of two.—Chino (Cal.) Champion.

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COFFEE QUARANTINED IN NEW YORK.

Over 100,000 bags of Brazil coffee are held in the lower harbor by the Health Department as a precaution against the introduction of the bubonic plague. The landing of this coffee after having been held in quarantine and the fact that it reaches the trade after having been roasted would seem to be sufficient precaution against its being a source of infection. Several steamers are on the way, carrying 192,000 bags from Santos and 187,000 bags from Rio, and if their cargoes are also denied entry, it must affect the market. The total amount of coffee at present so held is one-quarter of the total visible supply, but may temporarily cut down the stock here to a small quantity. The importers regard the action of the Board of Health as "folly," and are likely to take their coffee to some other port. On Monday the importers sent a petition to the Board of Health of this city, bearing the official endorsement of the Coffee Exchange, calling attention to the fact that the disease was subsiding at Santos and giving

reasons why the cargoes could be discharged and asking that such course be taken. The petition says:

"Coffee cargoes arriving at all English, German, French, Belgian, and Dutch ports have been given prompt discharge without quarantine.

"Coffee itself is regarded by the medical faculty as a mild disinfectant. To make coffee fit for use it is roasted in a temperature of not less than 300 degrees Fahrenheit, which will kill all disease germs.

"Coffee has constantly been shipped to New York from ports in Asia, where the disease called bubonic plague has existed for the past four years or more, but contagion from such sources is not known here.

"From all medical and scientific research, the precautions taken by the health authorities of the port of New York have been sufficient to eliminate all danger that might exist.

"The bubonic disease is not epidemic at the ports of Santos, only sporadic, and the mild character of it is attested to by the fact that among the laboring classes in Santos, the largest part of the population, chiefly Italians, Portuguese, and negroes, mostly engaged in shipping at the docks, and in a tropical climate, the disease has not spread and is under control.

"We, therefore, respectfully petition your honorable board to release the coffee in the usual course, since the sense and belief of the coffee trade is that all reasonable precautions have been exercised and that no further danger exists in handling the merchandise according to the usual methods, which of themselves are an absolute safeguard."—Am. Grocer.

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A cardinal principle of "government of the people, by the people, for the people" is that the people shall not be treated like children kept in the dark. A sound public opinion is the great bulwark of a republic, the foundation-stone on which its popularity and prosperity must needs rest. In this connection, the searching of the mails, the proscription of certain publications, and the stifling of correspondence are the most intolerable outrages which a free people has ever suffered, and it is significant most of all the development of a tendency which foreshadows that, whether we are likely to have imperialism in our distant possessions in form, we already have it at home in fact. BISHOP HENRY C. POTTER.